



Progress Report

Integrated Warfighter Biodefense Program (IWBP)

Submitted By: Quantum Leap Innovations, Inc.

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Contract Number: N00014-10-C-0363

Report Date: February 1, 2012

Reporting Period: October 1, 2011 – December 31, 2011

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DISTRIBUTION STATEMENT A

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Unclassified

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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 01 FEB 2012		2. REPORT TYPE		3. DATES COVERED 01-10-2011 to 31-12-2011	
4. TITLE AND SUBTITLE Integrated Warfighter Biodefense Program (IWPB)				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Quantum Leap Innovations, Inc, 3 Innovation Way, Suite 100, Newark, DE, 19711-5456				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 9	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

EXECUTIVE SUMMARY:

This report outlines Quantum Leap Innovations, Inc. (QLI) accomplishments during the three months of performance between September 30, 2011 and December 31, 2011 on ONR Contract N00014-10-C-0363 for the Integrated Warfighter Biodefense Program (IWBP). The report summarizes activities focused on continued development of the Quantum Leap Innovations Pattern Based Analytics (PBA) Platform.

SUMMARY OF ACCOMPLISHMENTS:

Continued Development of Quantum Leap Innovations Pattern Based Discovery:

- In the previous reporting period, we had summarized our initial implementation of the search engine work flow for Pattern Based Discovery. During the current reporting period, there were three major focus areas for continued development of Discovery:
 1. Addition of a report generation capability by implementing the Jasper Report Generator.
 2. Addition of a spreadsheet capability within Discovery to facilitate some additional analysis capability within the product. This capability was implemented using JComponentPack v3.3.4.
 3. Further refinements and improvements to the user interface.
- In addition, further work was done on developing Pattern Based Prediction by implementing a predictive analytics methodology based on stochastic decision trees.
- During the current reporting period, there were several discussions with third parties around customer engagements using our PBA platform.

EXTENSIONS TO PATTERN BASED DISCOVERY

The Quantum Leap Pattern Based Discovery (“Discovery”) product automatically discovers informative patterns against a user specified query using a search based paradigm. A ranked list of informative patterns that link to associated data subsets is generated from the search and displayed. This allows the user to easily perform targeted exploration, visualization and analysis of informative data subsets rather than all the data.

During the current reporting period, several enhancements were made to the Discovery product described in the previous quarterly report:

Addition of the Jasper report generation capability:

In order to allow the user to record observations of interest during the data exploration process, the Jasper Report Generator provided by JasperSoft was integrated into the Discovery product. This capability allows the user to select patterns of interest and add them to a customizable report that can be published as a pdf file at the end of the Discovery session. The workflow to realize this capability is reminiscent of adding items to a shopping cart in a consumer website that ultimately results in making a purchase.

We use the same Healthcare Fraud example from our previous quarterly report summarized below:

Healthcare Fraud Example:

It has been estimated that healthcare fraud and abuse can constitute between 3 -15% of annual healthcare expenditures in the United States. From a cost standpoint, this translates to \$100-\$170 billion in annual costs! Analysis of healthcare data to discover patterns that associate with different fraud types can potentially provide a proactive means for health care providers to detect fraud early on. In this example, we use a simulated data set of ~1 million patients based on an existing fraud model (“Healthcare Fraud and Abuse”, Rudman et al). Six fraud types are modeled based on statistical occurrence within the nation. An additional challenge with this data set is the prevalence of MISSING data that is characteristic of healthcare data.

Figure 1 below shows the addition of a new action at the far right of the pattern summary that enables the creation of a new report.



Figure 1. Addition of new action item for report creation

When the user selects “Create New Report”, an edit box to create the report appears as shown in Figure 2.

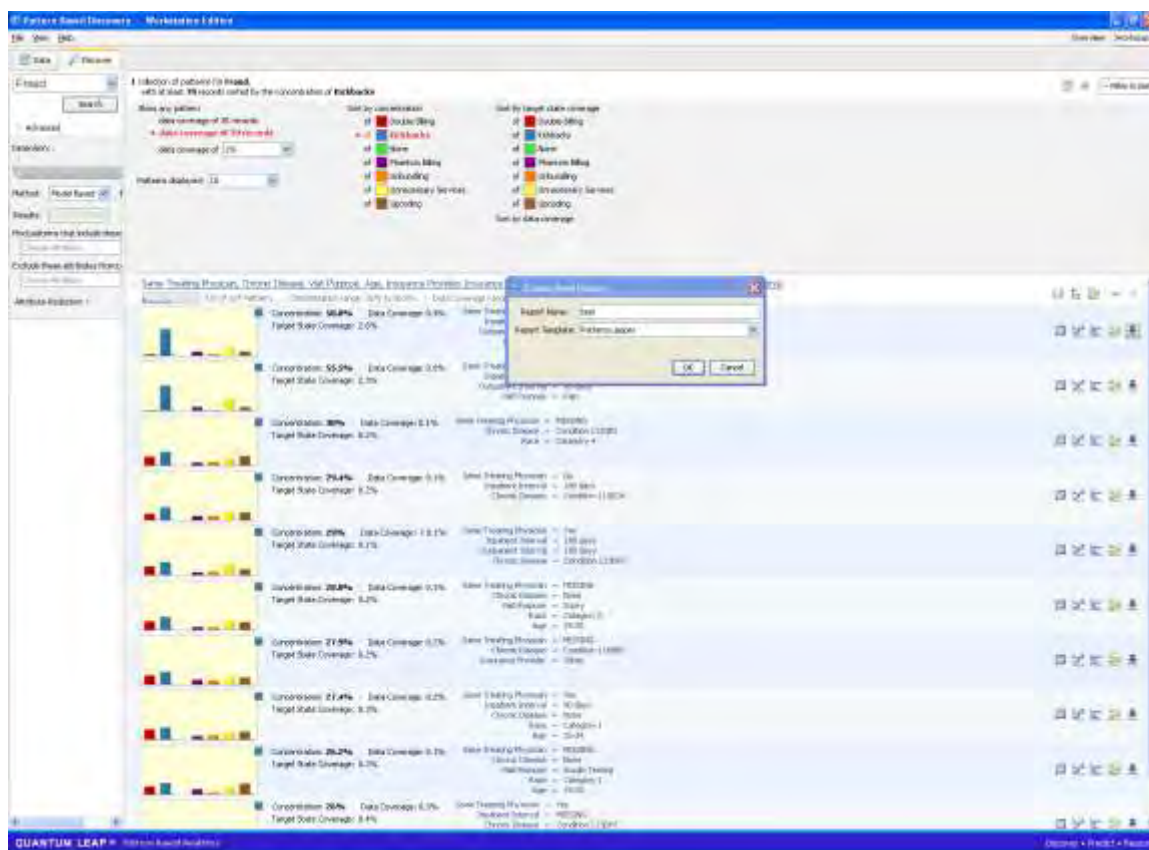


Figure 2. Creation of a new report

After the new report has been created, a pattern can be added to the report as shown in Figure 3. The highlighted icon at the top right of Figure 3, when clicked, will display the pattern report shown in Figure 4.

Publish report

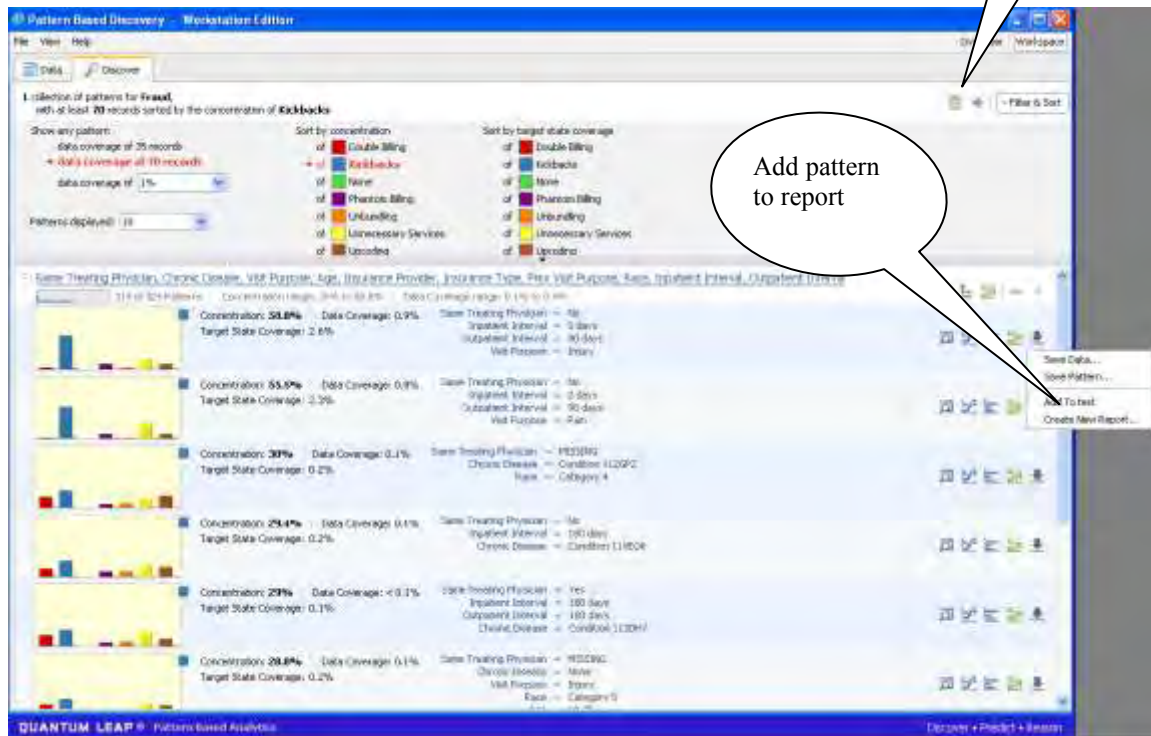


Figure 3. Adding a pattern to a report

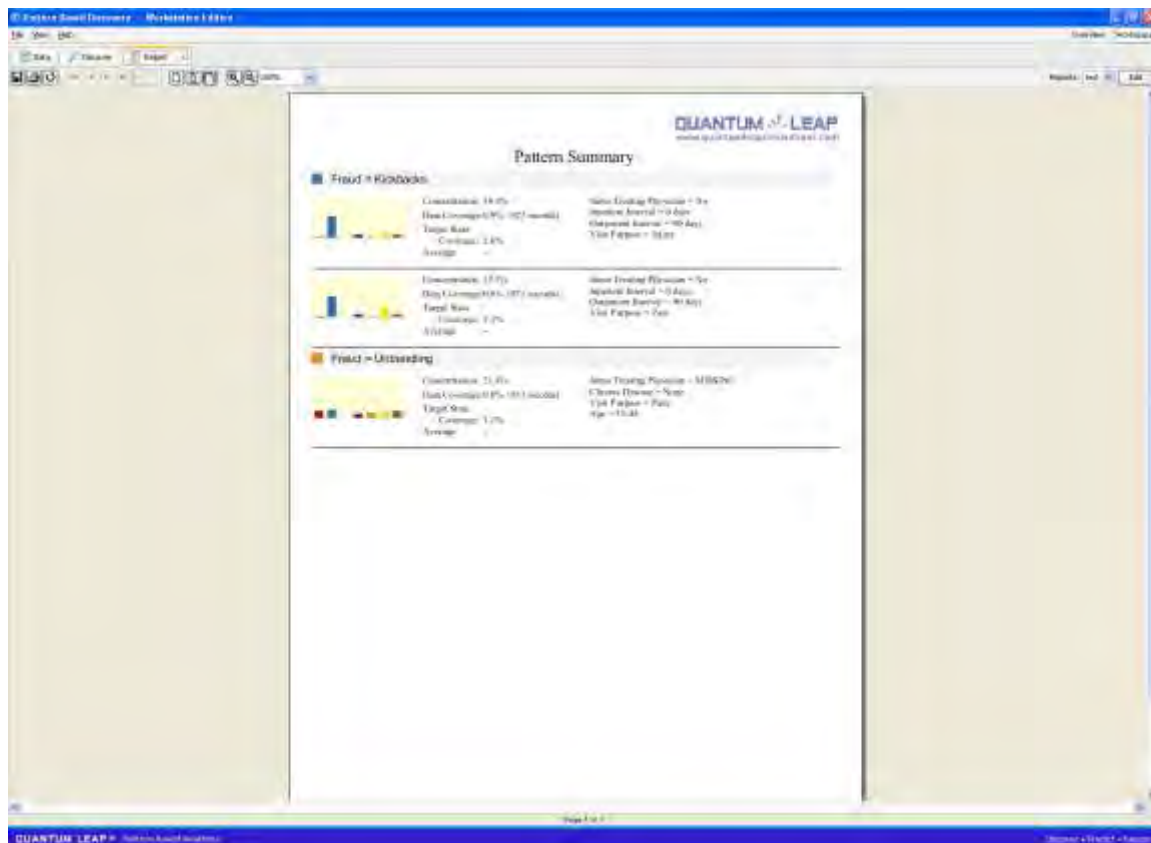
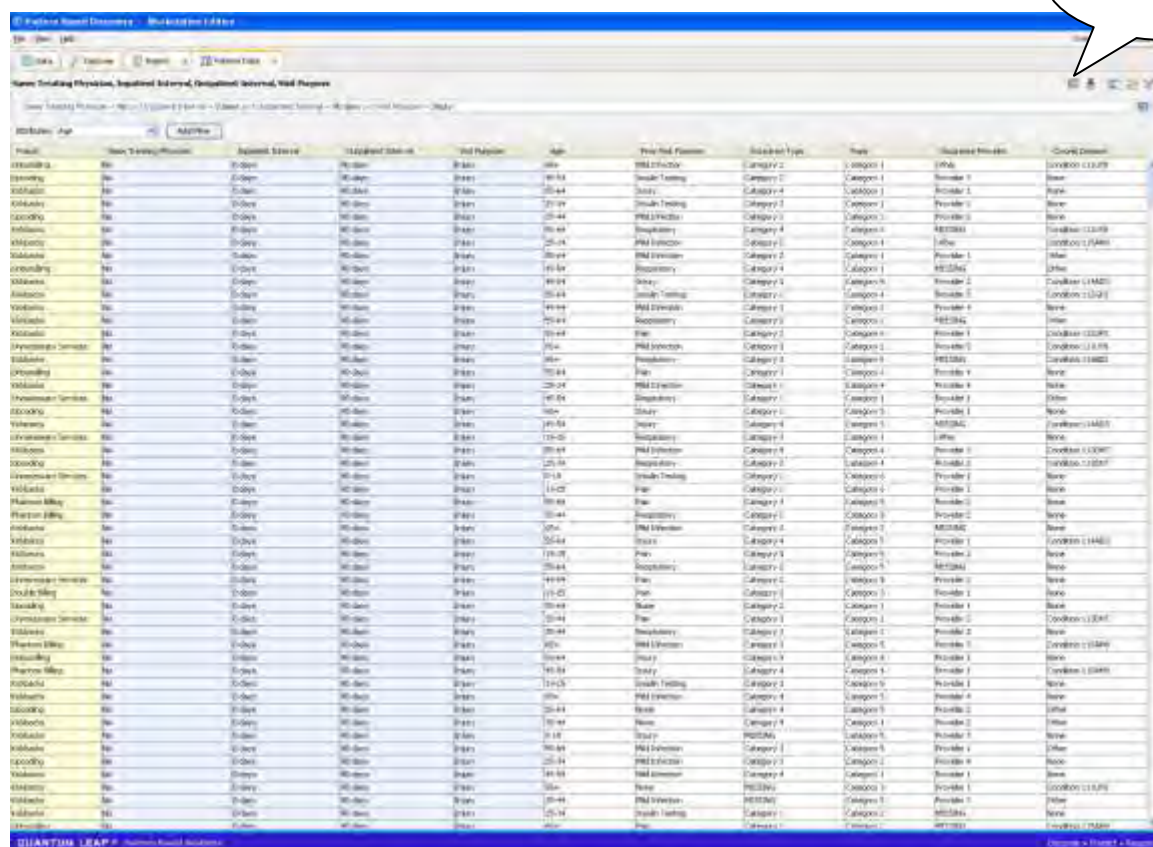


Figure 4. Example of a generated report

Addition of Spreadsheet capability:

In order to facilitate analysis of a data subset associated with a pattern, the data contained within a pattern can be automatically copied to a spreadsheet. This capability was implemented using JComponentPack v3.3.4. In Figure 5, the scratchpad icon on the top right of the pattern data table copies the data table into a spreadsheet as shown in Figure 6.



The screenshot displays the 'Pattern Data Table' in the Quantum Leap software. The table contains columns for various attributes including Patient, Sex, Date of Birth, Age, Height, Weight, and various test results. The 'Scratchpad icon' is located in the top right corner of the table area, represented by a small icon that looks like a notepad with a pencil.

Patient	Sex	Date of Birth	Age	Height	Weight	Test Results	Test Type	Test Date	Test Result	Test Unit
00000001	M	1980-01-01	30	175	175	100	100	100	100	100
00000002	F	1980-01-01	30	165	165	100	100	100	100	100
00000003	M	1980-01-01	30	175	175	100	100	100	100	100
00000004	F	1980-01-01	30	165	165	100	100	100	100	100
00000005	M	1980-01-01	30	175	175	100	100	100	100	100
00000006	F	1980-01-01	30	165	165	100	100	100	100	100
00000007	M	1980-01-01	30	175	175	100	100	100	100	100
00000008	F	1980-01-01	30	165	165	100	100	100	100	100
00000009	M	1980-01-01	30	175	175	100	100	100	100	100
00000010	F	1980-01-01	30	165	165	100	100	100	100	100
00000011	M	1980-01-01	30	175	175	100	100	100	100	100
00000012	F	1980-01-01	30	165	165	100	100	100	100	100
00000013	M	1980-01-01	30	175	175	100	100	100	100	100
00000014	F	1980-01-01	30	165	165	100	100	100	100	100
00000015	M	1980-01-01	30	175	175	100	100	100	100	100
00000016	F	1980-01-01	30	165	165	100	100	100	100	100
00000017	M	1980-01-01	30	175	175	100	100	100	100	100
00000018	F	1980-01-01	30	165	165	100	100	100	100	100
00000019	M	1980-01-01	30	175	175	100	100	100	100	100
00000020	F	1980-01-01	30	165	165	100	100	100	100	100
00000021	M	1980-01-01	30	175	175	100	100	100	100	100
00000022	F	1980-01-01	30	165	165	100	100	100	100	100
00000023	M	1980-01-01	30	175	175	100	100	100	100	100
00000024	F	1980-01-01	30	165	165	100	100	100	100	100
00000025	M	1980-01-01	30	175	175	100	100	100	100	100
00000026	F	1980-01-01	30	165	165	100	100	100	100	100
00000027	M	1980-01-01	30	175	175	100	100	100	100	100
00000028	F	1980-01-01	30	165	165	100	100	100	100	100
00000029	M	1980-01-01	30	175	175	100	100	100	100	100
00000030	F	1980-01-01	30	165	165	100	100	100	100	100
00000031	M	1980-01-01	30	175	175	100	100	100	100	100
00000032	F	1980-01-01	30	165	165	100	100	100	100	100
00000033	M	1980-01-01	30	175	175	100	100	100	100	100
00000034	F	1980-01-01	30	165	165	100	100	100	100	100
00000035	M	1980-01-01	30	175	175	100	100	100	100	100
00000036	F	1980-01-01	30	165	165	100	100	100	100	100
00000037	M	1980-01-01	30	175	175	100	100	100	100	100
00000038	F	1980-01-01	30	165	165	100	100	100	100	100
00000039	M	1980-01-01	30	175	175	100	100	100	100	100
00000040	F	1980-01-01	30	165	165	100	100	100	100	100
00000041	M	1980-01-01	30	175	175	100	100	100	100	100
00000042	F	1980-01-01	30	165	165	100	100	100	100	100
00000043	M	1980-01-01	30	175	175	100	100	100	100	100
00000044	F	1980-01-01	30	165	165	100	100	100	100	100
00000045	M	1980-01-01	30	175	175	100	100	100	100	100
00000046	F	1980-01-01	30	165	165	100	100	100	100	100
00000047	M	1980-01-01	30	175	175	100	100	100	100	100
00000048	F	1980-01-01	30	165	165	100	100	100	100	100
00000049	M	1980-01-01	30	175	175	100	100	100	100	100
00000050	F	1980-01-01	30	165	165	100	100	100	100	100
00000051	M	1980-01-01	30	175	175	100	100	100	100	100
00000052	F	1980-01-01	30	165	165	100	100	100	100	100
00000053	M	1980-01-01	30	175	175	100	100	100	100	100
00000054	F	1980-01-01	30	165	165	100	100	100	100	100
00000055	M	1980-01-01	30	175	175	100	100	100	100	100
00000056	F	1980-01-01	30	165	165	100	100	100	100	100
00000057	M	1980-01-01	30	175	175	100	100	100	100	100
00000058	F	1980-01-01	30	165	165	100	100	100	100	100
00000059	M	1980-01-01	30	175	175	100	100	100	100	100
00000060	F	1980-01-01	30	165	165	100	100	100	100	100
00000061	M	1980-01-01	30	175	175	100	100	100	100	100
00000062	F	1980-01-01	30	165	165	100	100	100	100	100
00000063	M	1980-01-01	30	175	175	100	100	100	100	100
00000064	F	1980-01-01	30	165	165	100	100	100	100	100
00000065	M	1980-01-01	30	175	175	100	100	100	100	100
00000066	F	1980-01-01	30	165	165	100	100	100	100	100
00000067	M	1980-01-01	30	175	175	100	100	100	100	100
00000068	F	1980-01-01	30	165	165	100	100	100	100	100
00000069	M	1980-01-01	30	175	175	100	100	100	100	100
00000070	F	1980-01-01	30	165	165	100	100	100	100	100
00000071	M	1980-01-01	30	175	175	100	100	100	100	100
00000072	F	1980-01-01	30	165	165	100	100	100	100	100
00000073	M	1980-01-01	30	175	175	100	100	100	100	100
00000074	F	1980-01-01	30	165	165	100	100	100	100	100
00000075	M	1980-01-01	30	175	175	100	100	100	100	100
00000076	F	1980-01-01	30	165	165	100	100	100	100	100
00000077	M	1980-01-01	30	175	175	100	100	100	100	100
00000078	F	1980-01-01	30	165	165	100	100	100	100	100
00000079	M	1980-01-01	30	175	175	100	100	100	100	100
00000080	F	1980-01-01	30	165	165	100	100	100	100	100
00000081	M	1980-01-01	30	175	175	100	100	100	100	100
00000082	F	1980-01-01	30	165	165	100	100	100	100	100
00000083	M	1980-01-01	30	175	175	100	100	100	100	100
00000084	F	1980-01-01	30	165	165	100	100	100	100	100
00000085	M	1980-01-01	30	175	175	100	100	100	100	100
00000086	F	1980-01-01	30	165	165	100	100	100	100	100
00000087	M	1980-01-01	30	175	175	100	100	100	100	100
00000088	F	1980-01-01	30	165	165	100	100	100	100	100
00000089	M	1980-01-01	30	175	175	100	100	100	100	100
00000090	F	1980-01-01	30	165	165	100	100	100	100	100
00000091	M	1980-01-01	30	175	175	100	100	100	100	100
00000092	F	1980-01-01	30	165	165	100	100	100	100	100
00000093	M	1980-01-01	30	175	175	100	100	100	100	100
00000094	F	1980-01-01	30	165	165	100	100	100	100	100
00000095	M	1980-01-01	30	175	175	100	100	100	100	100
00000096	F	1980-01-01	30	165	165	100	100	100	100	100
00000097	M	1980-01-01	30	175	175	100	100	100	100	100
00000098	F	1980-01-01	30	165	165	100	100	100	100	100
00000099	M	1980-01-01	30	175	175	100	100	100	100	100
00000100	F	1980-01-01	30	165	165	100	100	100	100	100

Figure 5. Scratchpad icon on top right of Pattern Data Table

Index	Name	Type	Status	Value	Unit	Category	Priority	Status	Status	Status
1	Pattern 1	Pattern	Pattern	10.00	Pattern	Pattern 1	Pattern 1	Pattern 1	Pattern 1	Pattern 1
2	Pattern 2	Pattern	Pattern	20.00	Pattern	Pattern 2	Pattern 2	Pattern 2	Pattern 2	Pattern 2
3	Pattern 3	Pattern	Pattern	30.00	Pattern	Pattern 3	Pattern 3	Pattern 3	Pattern 3	Pattern 3
4	Pattern 4	Pattern	Pattern	40.00	Pattern	Pattern 4	Pattern 4	Pattern 4	Pattern 4	Pattern 4
5	Pattern 5	Pattern	Pattern	50.00	Pattern	Pattern 5	Pattern 5	Pattern 5	Pattern 5	Pattern 5
6	Pattern 6	Pattern	Pattern	60.00	Pattern	Pattern 6	Pattern 6	Pattern 6	Pattern 6	Pattern 6
7	Pattern 7	Pattern	Pattern	70.00	Pattern	Pattern 7	Pattern 7	Pattern 7	Pattern 7	Pattern 7
8	Pattern 8	Pattern	Pattern	80.00	Pattern	Pattern 8	Pattern 8	Pattern 8	Pattern 8	Pattern 8
9	Pattern 9	Pattern	Pattern	90.00	Pattern	Pattern 9	Pattern 9	Pattern 9	Pattern 9	Pattern 9
10	Pattern 10	Pattern	Pattern	100.00	Pattern	Pattern 10	Pattern 10	Pattern 10	Pattern 10	Pattern 10
11	Pattern 11	Pattern	Pattern	110.00	Pattern	Pattern 11	Pattern 11	Pattern 11	Pattern 11	Pattern 11
12	Pattern 12	Pattern	Pattern	120.00	Pattern	Pattern 12	Pattern 12	Pattern 12	Pattern 12	Pattern 12
13	Pattern 13	Pattern	Pattern	130.00	Pattern	Pattern 13	Pattern 13	Pattern 13	Pattern 13	Pattern 13
14	Pattern 14	Pattern	Pattern	140.00	Pattern	Pattern 14	Pattern 14	Pattern 14	Pattern 14	Pattern 14
15	Pattern 15	Pattern	Pattern	150.00	Pattern	Pattern 15	Pattern 15	Pattern 15	Pattern 15	Pattern 15
16	Pattern 16	Pattern	Pattern	160.00	Pattern	Pattern 16	Pattern 16	Pattern 16	Pattern 16	Pattern 16
17	Pattern 17	Pattern	Pattern	170.00	Pattern	Pattern 17	Pattern 17	Pattern 17	Pattern 17	Pattern 17
18	Pattern 18	Pattern	Pattern	180.00	Pattern	Pattern 18	Pattern 18	Pattern 18	Pattern 18	Pattern 18
19	Pattern 19	Pattern	Pattern	190.00	Pattern	Pattern 19	Pattern 19	Pattern 19	Pattern 19	Pattern 19
20	Pattern 20	Pattern	Pattern	200.00	Pattern	Pattern 20	Pattern 20	Pattern 20	Pattern 20	Pattern 20
21	Pattern 21	Pattern	Pattern	210.00	Pattern	Pattern 21	Pattern 21	Pattern 21	Pattern 21	Pattern 21
22	Pattern 22	Pattern	Pattern	220.00	Pattern	Pattern 22	Pattern 22	Pattern 22	Pattern 22	Pattern 22
23	Pattern 23	Pattern	Pattern	230.00	Pattern	Pattern 23	Pattern 23	Pattern 23	Pattern 23	Pattern 23
24	Pattern 24	Pattern	Pattern	240.00	Pattern	Pattern 24	Pattern 24	Pattern 24	Pattern 24	Pattern 24
25	Pattern 25	Pattern	Pattern	250.00	Pattern	Pattern 25	Pattern 25	Pattern 25	Pattern 25	Pattern 25
26	Pattern 26	Pattern	Pattern	260.00	Pattern	Pattern 26	Pattern 26	Pattern 26	Pattern 26	Pattern 26
27	Pattern 27	Pattern	Pattern	270.00	Pattern	Pattern 27	Pattern 27	Pattern 27	Pattern 27	Pattern 27
28	Pattern 28	Pattern	Pattern	280.00	Pattern	Pattern 28	Pattern 28	Pattern 28	Pattern 28	Pattern 28
29	Pattern 29	Pattern	Pattern	290.00	Pattern	Pattern 29	Pattern 29	Pattern 29	Pattern 29	Pattern 29
30	Pattern 30	Pattern	Pattern	300.00	Pattern	Pattern 30	Pattern 30	Pattern 30	Pattern 30	Pattern 30
31	Pattern 31	Pattern	Pattern	310.00	Pattern	Pattern 31	Pattern 31	Pattern 31	Pattern 31	Pattern 31
32	Pattern 32	Pattern	Pattern	320.00	Pattern	Pattern 32	Pattern 32	Pattern 32	Pattern 32	Pattern 32
33	Pattern 33	Pattern	Pattern	330.00	Pattern	Pattern 33	Pattern 33	Pattern 33	Pattern 33	Pattern 33
34	Pattern 34	Pattern	Pattern	340.00	Pattern	Pattern 34	Pattern 34	Pattern 34	Pattern 34	Pattern 34
35	Pattern 35	Pattern	Pattern	350.00	Pattern	Pattern 35	Pattern 35	Pattern 35	Pattern 35	Pattern 35
36	Pattern 36	Pattern	Pattern	360.00	Pattern	Pattern 36	Pattern 36	Pattern 36	Pattern 36	Pattern 36
37	Pattern 37	Pattern	Pattern	370.00	Pattern	Pattern 37	Pattern 37	Pattern 37	Pattern 37	Pattern 37
38	Pattern 38	Pattern	Pattern	380.00	Pattern	Pattern 38	Pattern 38	Pattern 38	Pattern 38	Pattern 38
39	Pattern 39	Pattern	Pattern	390.00	Pattern	Pattern 39	Pattern 39	Pattern 39	Pattern 39	Pattern 39
40	Pattern 40	Pattern	Pattern	400.00	Pattern	Pattern 40	Pattern 40	Pattern 40	Pattern 40	Pattern 40
41	Pattern 41	Pattern	Pattern	410.00	Pattern	Pattern 41	Pattern 41	Pattern 41	Pattern 41	Pattern 41
42	Pattern 42	Pattern	Pattern	420.00	Pattern	Pattern 42	Pattern 42	Pattern 42	Pattern 42	Pattern 42
43	Pattern 43	Pattern	Pattern	430.00	Pattern	Pattern 43	Pattern 43	Pattern 43	Pattern 43	Pattern 43
44	Pattern 44	Pattern	Pattern	440.00	Pattern	Pattern 44	Pattern 44	Pattern 44	Pattern 44	Pattern 44
45	Pattern 45	Pattern	Pattern	450.00	Pattern	Pattern 45	Pattern 45	Pattern 45	Pattern 45	Pattern 45
46	Pattern 46	Pattern	Pattern	460.00	Pattern	Pattern 46	Pattern 46	Pattern 46	Pattern 46	Pattern 46
47	Pattern 47	Pattern	Pattern	470.00	Pattern	Pattern 47	Pattern 47	Pattern 47	Pattern 47	Pattern 47
48	Pattern 48	Pattern	Pattern	480.00	Pattern	Pattern 48	Pattern 48	Pattern 48	Pattern 48	Pattern 48
49	Pattern 49	Pattern	Pattern	490.00	Pattern	Pattern 49	Pattern 49	Pattern 49	Pattern 49	Pattern 49
50	Pattern 50	Pattern	Pattern	500.00	Pattern	Pattern 50	Pattern 50	Pattern 50	Pattern 50	Pattern 50
51	Pattern 51	Pattern	Pattern	510.00	Pattern	Pattern 51	Pattern 51	Pattern 51	Pattern 51	Pattern 51
52	Pattern 52	Pattern	Pattern	520.00	Pattern	Pattern 52	Pattern 52	Pattern 52	Pattern 52	Pattern 52
53	Pattern 53	Pattern	Pattern	530.00	Pattern	Pattern 53	Pattern 53	Pattern 53	Pattern 53	Pattern 53
54	Pattern 54	Pattern	Pattern	540.00	Pattern	Pattern 54	Pattern 54	Pattern 54	Pattern 54	Pattern 54
55	Pattern 55	Pattern	Pattern	550.00	Pattern	Pattern 55	Pattern 55	Pattern 55	Pattern 55	Pattern 55
56	Pattern 56	Pattern	Pattern	560.00	Pattern	Pattern 56	Pattern 56	Pattern 56	Pattern 56	Pattern 56
57	Pattern 57	Pattern	Pattern	570.00	Pattern	Pattern 57	Pattern 57	Pattern 57	Pattern 57	Pattern 57
58	Pattern 58	Pattern	Pattern	580.00	Pattern	Pattern 58	Pattern 58	Pattern 58	Pattern 58	Pattern 58
59	Pattern 59	Pattern	Pattern	590.00	Pattern	Pattern 59	Pattern 59	Pattern 59	Pattern 59	Pattern 59
60	Pattern 60	Pattern	Pattern	600.00	Pattern	Pattern 60	Pattern 60	Pattern 60	Pattern 60	Pattern 60
61	Pattern 61	Pattern	Pattern	610.00	Pattern	Pattern 61	Pattern 61	Pattern 61	Pattern 61	Pattern 61
62	Pattern 62	Pattern	Pattern	620.00	Pattern	Pattern 62	Pattern 62	Pattern 62	Pattern 62	Pattern 62
63	Pattern 63	Pattern	Pattern	630.00	Pattern	Pattern 63	Pattern 63	Pattern 63	Pattern 63	Pattern 63
64	Pattern 64	Pattern	Pattern	640.00	Pattern	Pattern 64	Pattern 64	Pattern 64	Pattern 64	Pattern 64
65	Pattern 65	Pattern	Pattern	650.00	Pattern	Pattern 65	Pattern 65	Pattern 65	Pattern 65	Pattern 65
66	Pattern 66	Pattern	Pattern	660.00	Pattern	Pattern 66	Pattern 66	Pattern 66	Pattern 66	Pattern 66
67	Pattern 67	Pattern	Pattern	670.00	Pattern	Pattern 67	Pattern 67	Pattern 67	Pattern 67	Pattern 67
68	Pattern 68	Pattern	Pattern	680.00	Pattern	Pattern 68	Pattern 68	Pattern 68	Pattern 68	Pattern 68
69	Pattern 69	Pattern	Pattern	690.00	Pattern	Pattern 69	Pattern 69	Pattern 69	Pattern 69	Pattern 69
70	Pattern 70	Pattern	Pattern	700.00	Pattern	Pattern 70	Pattern 70	Pattern 70	Pattern 70	Pattern 70
71	Pattern 71	Pattern	Pattern	710.00	Pattern	Pattern 71	Pattern 71	Pattern 71	Pattern 71	Pattern 71
72	Pattern 72	Pattern	Pattern	720.00	Pattern	Pattern 72	Pattern 72	Pattern 72	Pattern 72	Pattern 72
73	Pattern 73	Pattern	Pattern	730.00	Pattern	Pattern 73	Pattern 73	Pattern 73	Pattern 73	Pattern 73
74	Pattern 74	Pattern	Pattern	740.00	Pattern	Pattern 74	Pattern 74	Pattern 74	Pattern 74	Pattern 74
75	Pattern 75	Pattern	Pattern	750.00	Pattern	Pattern 75	Pattern 75	Pattern 75	Pattern 75	Pattern 75
76	Pattern 76	Pattern	Pattern	760.00	Pattern	Pattern 76	Pattern 76	Pattern 76	Pattern 76	Pattern 76
77	Pattern 77	Pattern	Pattern	770.00	Pattern	Pattern 77	Pattern 77	Pattern 77	Pattern 77	Pattern 77
78	Pattern 78	Pattern	Pattern	780.00	Pattern	Pattern 78	Pattern 78	Pattern 78	Pattern 78	Pattern 78
79	Pattern 79	Pattern	Pattern	790.00	Pattern	Pattern 79	Pattern 79	Pattern 79	Pattern 79	Pattern 79
80	Pattern 80	Pattern	Pattern	800.00	Pattern	Pattern 80	Pattern 80	Pattern 80	Pattern 80	Pattern 80
81	Pattern 81	Pattern	Pattern	810.00	Pattern	Pattern 81	Pattern 81	Pattern 81	Pattern 81	Pattern 81
82	Pattern 82	Pattern	Pattern	820.00	Pattern	Pattern 82	Pattern 82	Pattern 82	Pattern 82	Pattern 82
83	Pattern 83	Pattern	Pattern	830.00	Pattern	Pattern 83	Pattern 83	Pattern 83	Pattern 83	Pattern 83
84	Pattern 84	Pattern	Pattern	840.00	Pattern	Pattern 84	Pattern 84	Pattern 84	Pattern 84	Pattern 84
85	Pattern 85	Pattern	Pattern	850.00	Pattern	Pattern 85	Pattern 85	Pattern 85	Pattern 85	Pattern 85
86	Pattern 86	Pattern	Pattern	860.00	Pattern	Pattern 86	Pattern 86	Pattern 86	Pattern 86	Pattern 86
87	Pattern 87	Pattern	Pattern	870.00	Pattern	Pattern 87	Pattern 87	Pattern 87	Pattern 87	Pattern 87
88	Pattern 88	Pattern	Pattern	880.00	Pattern	Pattern 88	Pattern 88	Pattern 88	Pattern 88	Pattern 88
89	Pattern 89	Pattern	Pattern	890.00	Pattern	Pattern 89	Pattern 89	Pattern 89	Pattern 89	Pattern 89
90	Pattern 90	Pattern	Pattern	900.00	Pattern	Pattern 90	Pattern 90	Pattern 90	Pattern 90	Pattern 90
91	Pattern 91	Pattern	Pattern	910.00	Pattern	Pattern 91	Pattern 91	Pattern 91	Pattern 91	Pattern 91
92	Pattern 92	Pattern	Pattern	920.00	Pattern	Pattern 92	Pattern 92	Pattern 92	Pattern 92	Pattern 92
93	Pattern 93	Pattern	Pattern	930.00	Pattern	Pattern 93	Pattern 93	Pattern 93	Pattern 93	Pattern 93
94	Pattern 94	Pattern	Pattern	940.00	Pattern	Pattern 94	Pattern 94	Pattern 94	Pattern 94	Pattern 94
95	Pattern 95	Pattern	Pattern	950.00	Pattern	Pattern 95	Pattern 95	Pattern 95	Pattern 95	Pattern 95
96	Pattern 96	Pattern	Pattern	960.00	Pattern	Pattern 96	Pattern 96	Pattern 96	Pattern 96	Pattern 96
97	Pattern 97	Pattern	Pattern	970.00	Pattern	Pattern 97	Pattern 97	Pattern 97	Pattern 97	Pattern 97
98	Pattern 98	Pattern	Pattern	980.00	Pattern	Pattern 98	Pattern 98	Pattern 98	Pattern 98	Pattern 98
99	Pattern 99	Pattern	Pattern	990.00	Pattern	Pattern 99	Pattern 99	Pattern 99	Pattern 99	Pattern 99
100	Pattern 100	Pattern	Pattern	1000.00	Pattern	Pattern 100	Pattern 100	Pattern 100	Pattern 100	Pattern 100

Figure 6. Spreadsheet copy of Pattern Data Table

The spreadsheet implemented within Discovery allows the user to enter formulae, insert columns and perform several of the most commonly used functions within Excel.

Further refinements to the User Interface

During the current reporting period, several aesthetic and functional refinements were made to the User Interface based on feedback from users.

Implementation of stochastic decision trees for Pattern Based Prediction

During the current reporting period, initial work was begun on the implementation of ensembles of stochastic decision trees as a basis for Pattern Based Prediction. The primary motivation is to use the same modeling paradigm used in Discovery for implementing Pattern Based Prediction. This will allow a seamless integration of a Business Intelligence capability defined by Discovery with a Business Analytics capability defined by Prediction so that users can easily go back and forth between BI and BA. A more complete description of Pattern Based Prediction will be provided in the next report.

Customer Engagements:

During the current reporting period, significant effort has been spent on exposing the Quantum Leap Pattern Based Analytics Platform to the broader Analytics community.

There have been several ongoing discussions with enterprise customers on engagements based on the PBA platform. They include health care, financial services and retail customers for a variety of applications where the ability of patterns to filter, organize and fuse disparate data sources are of particular interest.

NEXT STEPS:

During the next reporting period, we will report on our engagement efforts with prospective enterprise customers. In addition, work will begin on fully integrating Pattern Based Prediction (to enable Predictive Analytics) with Pattern Based Discovery.

FINANCIAL SUMMARY:

Contract Activity

QLI Contract N00014-10-C-0363	\$2,987,891
Award date: 07/01/2010	

ACTUAL: Expenditures Invoiced to the Government through December 31, 2011	\$2,330,234
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78% of Contract Value has been spent as of December 31, 2011